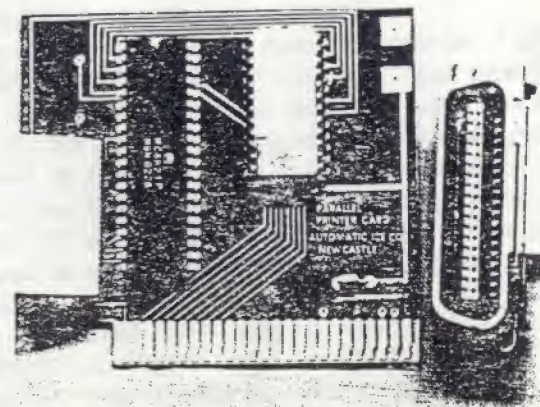# autømatic ice
parallel printer card

for the Apple II & IIe

The Automatic Ice Universal Parallel Printer Card is a peripheral card for the Apple II, IIe and III which drives most parallel connected dot matrix and daisywheel printers. It also contains graphics dumps (on the II and IIe) for most popular dot matrix printers.

INTRODUCTION

1) Turn off the Apple.

2) Remove the lid.

3) Insert the printer card in Slot 1. Any slot except 0 will do, but 1 is normal. Graphics can only be dumped from Slot 1.

4) Pass the cable out the back of the Apple and close the lid. In the case of the IIe the cable and plug can be passed through the hole above the power supply.

5) Connect the Centronics connector to the printer. If the connector does not fit, e.g. Prism, Bytewriter then see your dealer. Other connectors are available from Automatic Ice.

6) Turn on the printer, load it with paper and ensure it is online to the computer by pressing the online or select switch. Some printers are permanently online.

7) To access the printer from the computer first load something, such as a BASIC program to list out, then type PR#1 and then type LIST. The program will list on the printer instead of the screen. To allow the printer to extend beyond the 40 column screen size you need to type CTRL I 80 N (with no spaces) then RETURN. This initialises the printer to print 80 characters then a carriage return. To access the printer from within an Applesoft program you need to precede the PR#1 command with a CTRL D or CHR$(4).
EXAMPLE:

```
10 D$=CHR$(4)
20PRINT D$;"PR#1"
30PRINT "THIS IS HOW THE PRINTER WORKS"
40PRINT D$;"PR#0":REM TURNS THE PRINTER OFF
50 END
```

8) If the word PRINTER appears at the top right hand corner of the screen, the printer is either out of paper, not switched on or not online. You can continue printing by fixing the problem and pressing RETURN.

9) That's all you need to start using your printer. More detailed instructions follow.

IN DEPTH

The Automatic Ice Co Universal Parallel Printer Card is a general purpose parallel output printer card suitable for connecting Apple II, IIe and III computers to most printers with a seven or eight bit parallel input. It outputs +ve true eight bit strobe with -ve strobe and expects a -ve acknowledge from the printer. This is the format expected by most printers but special EPROMs are available to support other modes.

It has onboard software to disassemble and output from the II and IIe high resolution graphics on page 1 and 2 to the printer. The one EPROM covers the following printers:

1) Apple D.M.P.
2) EPSON TYPE II and III
3) NMUST DT80
4) CASE
5) GRAPHICS STAR
6) MICROLINE 92 and 93
7) PRISM & PAPER TIGER
8) C.ITOH 8510 and 1550
9) SEIKOSHA
10) NEC FONTWRITER

Other printers not listed above may have the same graphics format, and trying them will not do any damage.

TECHNICAL DETAILS

The card conforms to the recently published Apple Firmware standard and consequently may be incompatible with software which is outside of this standard. Such software includes Pascal 1.0 and CP/M 2.2. Later versions of Pascal and CP/M run with the card, but if you intend to run older versions of such popular programs as WordStar or PFS you will probably find they don't print properly. The card is assured, however, of being compatible with all future Apple correct software.

The card will output text in any slot except 0 but it must be in Slot 1 to output graphics. Pascal and CP/M always expect Slot 1.

The graphics dump routines use locations 2EF - 2FF at the top end of the keyboard buffer as scratchpad and any other program that uses these locations will overwrite graphics. There is also a monitor routine at $F411 which must not be switched off by the memory card.

The Apple outputs a seven bit code with the eighth bit set high. The card strips the eighth bit and sends the seven bit code most printers expect. The eighth bit is ignored by most printers in the text mode but some printers output a different character set when the eighth bit is high (e.g. block graphics). There is a card command CTRL I H to set the

eighth bit high, and CTRL I X to reset it, but since the Apple only outputs seven bit code care must be taken with the interpretation of the character #$8D when the high bit is set. The printer card interprets it as a carriage return and if it is set as a block graphics character a carriage return will occur.

Most printers use escape codes to change format, character sets etc. The Apple traps the escape character for cursor movement and it cannot be directly output to the printer. The solution is to print CHR$(27) instead of the ESC character.

e.g. 10 PRINT CHR$(27); "Q"

sets the Apple DMP printer to compressed print mode.

Most printers have a switch selectable function which outputs a linefeed or not after a carriage return. The printer card defaults to the condition of supplying its own linefeed after a carriage return in Applesoft, but not in PASCAL or CP/M. This means that the printer should be set not to generate a linefeed after carriage return (The normal factory setting), however the printer card operation can be software selected (Refer command table)

Using our EPROM programmer it is possible to modify the EPORM to support single keystroke custom letterheads (CTRL L) and print UPC barcode labels directly from the keyboard. Refer to Automatic Ice for details.

CABLE CONNECTIONS

The 26 way ribbon is connected to a standard Centronics edge connector (Other connectors available on request).The following is a pinout description for connection to other plugs:

WIRE	FUNCTION	
1	STROBE	NEGATIVE/ACTIVE
3	DATA 0	+VE TRUE
5	DATA 1	" "
7	DATA 2	" "
9	DATA 3	" "
11	DATA 4	" "
13	DATA 5	" "
15	DATA 6	" "
17	DATA 7	" "
19	ACKNOWLEDGE	NEGATIVE ACTIVE
26	SELECT	POSITIVE ACTIVE

Wires 2,4,6,8,10,12,14,16,18,20,22,24 are ground and should be connected together to avoid crosstalk. Numbers on the wires begin with the blue outer wire as wire 1
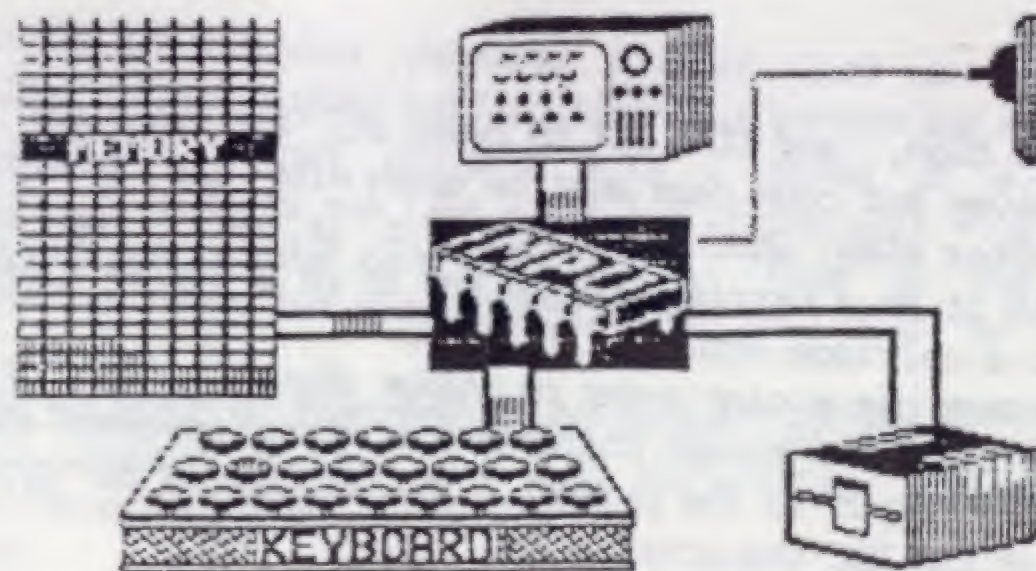
**ALL WE NEED DO IS CONNECT A VIDEO SCREEN
IN ORDER TO SEE THE RESULTS OF OUR WORK.**
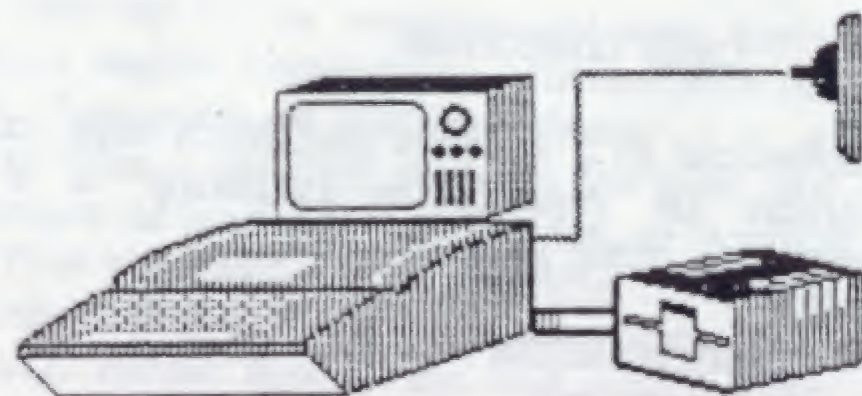
THE 'APPLE' MICROCOMPUTER.

SOFTWARE COMPATABILITY

The card programming conforms rigidly to the latest published Apple Firmware standard and as such shuld run all recent and future Apple correct software. If your program hangs the best solution is to update the software as this will eventually be necessary anyway. If the setup software asks for a specification, enter "FIRMWARE".

PRINTER CARD CONTROL CODES

The printer card is turned on by PR#1 and turned off by PR#0. From monitor the command is 1 control P and 0 control P.

The following printer card commands are all preceded by CONTROL I:

CTRL I I puts output to both printer and screen at 40 column width.

CTRL I n N returns output to the printr only and prints n characters per line where 40(n(255. When initialised the card outputs to the printer only.

CTRL I K turns off the linefeed provided by the card after every carriage return. When initialised the card defaults to a linefeed after carriage return in Apple soft but not PASCAL or CP/M.

CTRL I CTRL A exchanges the printer card escape character from CTRL I to CTRL A. This is sometimes necessary when listing a program to ensure that the printer doesn't perform sequences described in the program. Other characters than CTRL A can be used provided they dont conflict with other card commands. To return to CTRL I as the escape character the card must be turned off and then on again, or the sequence CTRL I CTRL A must be sent to the card/

CTRL I H sets the eighth bit high.

CTRL I X resets the eighth bit.

HI RES GRAPHICS COMMANDS

The card has onboard software to support Apple hi res graphics dumps to most dot matrix printers. All graphics commands are preceded by CTRL I G and then the letter associated with the particular printer. This may be followed by additional characters to specify other graphics features:

1 prints hires page 1

2 prints hires page 2

I inverse (white on black)

D double size pictures

E available only on EPSON, AMUST STAR, CASE and similar type printers. Causes picture to be printed double density.

J causes page 1 and page 2 to be printed side by side, and if the 2 pictures match up a horizontal resolution of 560 dots can be attained.

Additional pictures can be loaded in from disk allowing the printing of hires pictures of indefinite klength and 560 dots wide. With accurate software this can be used as a plotter to lay out such items as printed circuits, including double sided printouts.

W causes the C.ITOH type printers to accept the character pitch set on the printer before the graphics mode is entered. On the AMUST, EPSON, STAR, CASE and SEIKOSHA printers W is used to start printing in from the left margin. The card expects the value of the indent from the left margin to be found in location $2EF or 751 decimal. For the SEIKOSHA the value is the number of dot positions(480 for full line less 280 for picture)while for the others it is the number of characters in from the margin. e.g.from Applesoft

    Poke 751,10

 and from monitor

    $2EF:0A

start the SEIKOSHA picture 10 dots from the left edge.
In general picture printing starts at the left margin. Most other printers have a code to set the left margin.

A prints the top half of the picture.

B prints the top quarter.

SPECIFYING PRINTERS

All printers are the same regarding text but they have different ways of printing graphics and the printer must be identified when dumping graphics to it. Printer identification codes are as follows:

APPLE DMP	CTRL I G ⌐
C.ITOH	CTRL I G ⌐
NEC	CTRL I G
AMUST, STAR, CASE	CTRL I G Q
MICROLINE 92 & 93	CTRL I G U
PRISM.	CTRL I G P
EPSON	CTRL I G M
SEIKOSHA	CTRL I G S

The SEIKOSHA can only print 480 dots/line and cannot do double or side. by sideo. The EPSON has only 480 horizontal dots in normal mode causing the double size pictures to run off the page, but the addition of E to the string generates a normal picture in which each of the 280 horizontal dots is struck 3 times.

All appropriate graphics commands can be strung together but double size and side by side are not allowed together.
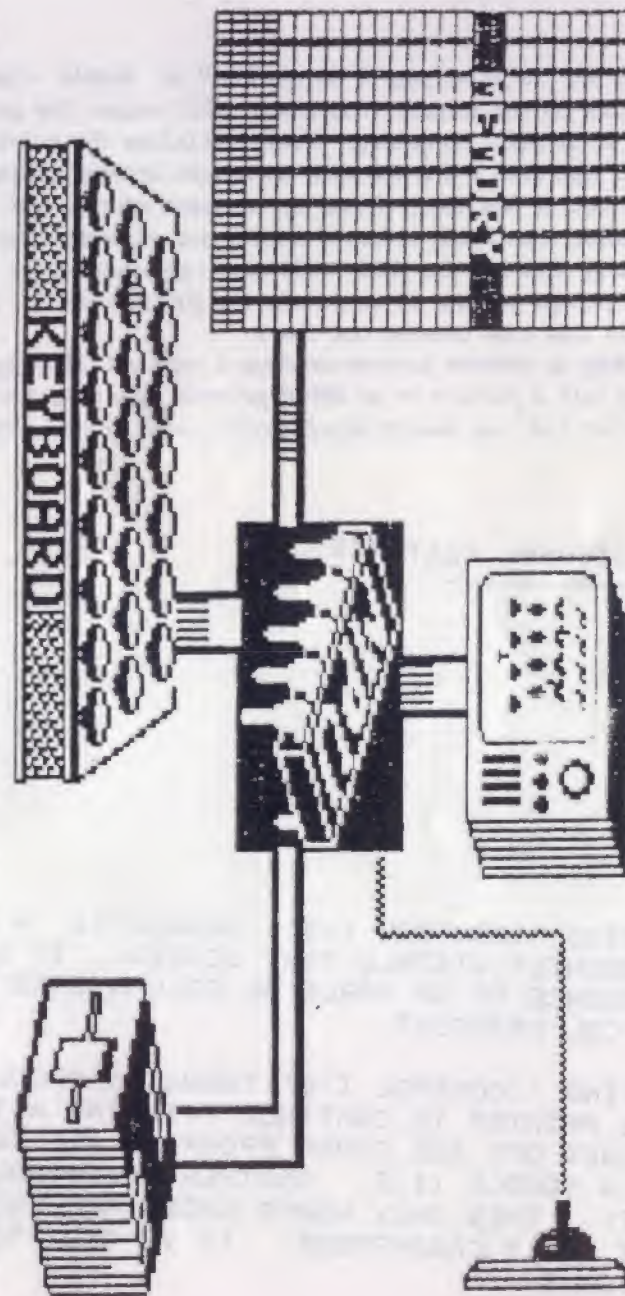
EXAMPLES: To print page 2 on an EPSON in double size first get the picture on the screen. Then reset. This causes the picture to disappear but it is still in memory. Next initialise the printer with a PR#1. Then type CTRL I G 2 M D with no spaces between characters. i.e. hold the control key down, Press I, Release control and I then press g and release, then 2 and release, then M and release, then D and release and finally RETURN. The EPSON will now dump whatever is in Page 2 memory. If it dumps garbage it is likely the picture was in Page 1, so try again this time leaving out the 2.
To dump an inverse picture on Page 1 onto a C.ITOH type CTRL I G I. To dump half a picture on an APPLE printer type CTRL I G F A etc.
You can't do any damage experimenting with graphics dumps.

ADDITIONAL FEATURES

TYPING '<CONTROL I>S' GENERATES A DUMP OF THE CURRENTLY VISIBLE TEXT SCREEN. IT CAN DETECT THE PRESENCE OF AN APPLE 80 COLUMN CARD AND ADJUST TO 80 COL PRINTOUT.

TYPING '<CONTROL I>B' TURNS ON SPOOLING AND ALLOWS THE PRINTER TO CONTINUE PRINTING AFTER THE CARD IS TURNED OFF AND OTHER PROGRAMS ARE BEING RUN. THIS IS A TOGGLE (I.E. ANOTHER '<CONTROL I>B TURNS IT OFF). THIS ONLY WORKS UNDER APPLESOFT AND IS NOT YET FULLY CRASHPROOF. IT IS ONLY TO BE CONSIDERED A BONUS.

MOUSEPAINT GRAPHICS DUMP.

The Mousepaint program supplied with the APPLE Mouse has its own internal graphics dump routines in the software. These routines are written to drive only APPLE Printers and will not work on other printers with differnt control codes and needle firing arrangements, especially EPSON & EPSON compatible Printers.

This note details a printer driver routine which can be placed on a BACKUP COPY of the Mousepaint diskette to allow direct graphics dumps from the program to other printers when using the AUTOMATIC ICE PRINTER INTERFACE CARDS (both paralell & serial).

TO INSTALL THE DRIVER:-
----

1. Use the ProDos Filer Program to make a backup copy of the Mousepaint Diskette. Install the driver only on the backup copy in case something goes wrong.

2. Boot the Mousepaint diskette & use the mouse to pull down the "FILE" menu and exit the program.

3. Enter the monitor by typing CALL -151 followed by a carriage return. An aesterisk will appear as the monitor prompt.

4. Type "8DFD:"followed by the characters as outlined below finishing with a carriage return.

5. Type "CONTROL C" to return to basic system followed by "BSAVE /MOUSEPAINT/MP/PRINTDRIVER,A$8DFD,L$35" ending with a carriage return.

You will now be able to use the mouse for graphics dumps. The routine below prints a double size inverse image of page 2 graphics using an EPSON compatible printer. Bytes can be changed for other options.

Type This

↓

]
]CALL-151 ← *Carriage Return here*

*8DFD:08 48 A5 36 48 8E 30 02 8C 31 02 A
9 89 20 00 C1 A9 C7 20 05 C1 A9 D1 20 05
C1 A9 C4 20 05 C1 A9 C9 20 05 C1 A9 8D
20 05 C1 AE 30 02 AC 31 02 68 85 36 68 2
8 60 ← *Carriage Return here*

* ← *This just appears (don't type it)*
Type Control C here
]BSAVE /MOUSEPAINT/MP/PRINTDRIVER,A$8DFD
],L$35 ← *Carrige Return here*

```
*8DFD:LL
8DFD-    08           PHP
8DFE-    48           PHA
8DFF-    A5 36        LDA    $36
8E01-    48           PHA
8E02-    8E 30 02     STX    $0230
8E05-    8C 31 02     STY    $0231
8E08-    A9 89        LDA    #$89    conts
8E0A-    20 00 C1     JSR    $C100
8E0D-    A9 C7        LDA    #$C7    — G
8E0F-    20 05 C1     JSR    $C105
8E12-    A9 D1        LDA    #$D1    — Q
8E14-    20 05 C1     JSR    $C105
8E17-    A9 C4        LDA    #$C4    — D
8E19-    20 05 C1     JSR    $C105
8E1C-    A9 C9        LDA    #$C9    — I
8E1E-    20 05 C1     JSR    $C105
8E21-    A9 8D        LDA    #$8D    C
8E23-    20 05 C1     JSR    $C105
8E26-    AE 30 02     LDX    $0230
8E29-    AC 31 02     LDY    $0231
8E2C-    68           PLA
8E2D-    85 36        STA    $36
8E2F-    68           PLA
8E30-    28           PLP
8E31-    60           RTS
```

PRINTSHOP

The program PRINTSHOP requires that the printer card interface be specified during setup. The Automatic Ice card is not on the list (it is being added) but it will work if it is specified as an APPLE SUPER SERIAL CARD. The current version of the card works perfectly under this setup but there may be some problems with earlier versions.

If your printer is not EXACTLY one of those in the setup list (e.g. many Epson compatables) it may give a stretched or squat picture. This has nothing to do with the interface card but in some cases you may be able to alter the character pitch spacing with the printer dip switches to improve it.

DUMB MODE

Although the Automatic Ice Interface card rigidly conforms to APPLE'S published Firmware standard for peripheral cards, there are sometimes problems with programs that do not follow this convention (e.g. old or non standard programs). Also it is often useful to be able to use the card as a straight 8 bit output device for non printer devices like plotters or D to A convertors.

To overcome any problems that might arise, we have included a command to remove all intelligence from the interface card so that it passes the ASCII characters received from the computer directly to the printer "as is" except that the eighth bit is always low. In this mode, the card does not intercept any "CONTROL I" commands, does not keep track of column width and does not generate any linefeeds or carriage returns of its own. To use this mode, turn on the card with "PR#1" & then type CONTROL I followed by "Z" (i.e. hold down the control key while typing "I", release the control key & type "Z"). The dumb mode will remain in effect until the card is reinitialised.

The DUMB mode will accept output in the normal BASIC or PASCAL FIRMWARE manner. From BASIC the value in the accumulator can be output by a "JSR" to $C105 for slot #1. A call to $C100 will reinitialise the card & turn off the DUMB mode. The code will return to the calling program after the printer handshake acknowledgement or hang if the printer does not acknowledge.

For the FIRMWARE output, the offset addresses are in the normal place ($C1OD-$C110). The code for READ is just "RTS". INITIALISATION turns off the DUMB MODE. The STATUS & WRITE code can be examined by typing "$C1OOL <cr>" from the monitor. From BASIC the monitor can be entered by typing "CALL-151 <cr>".

The APPLE normally outputs a seven bit code with the eighth bit set high for BASIC & low for PASCAL style output (including ProDos). Since most printers ignore the eighth bit, this usually doesn't matter, but many newer printers use the eighth bit for: special character sets (e.g. Italics) & in dot addressable graphics. For compatability with BASIC & most printers, the DUMB mode masks off the eightht bit (sets it low) but the eight bits can be written to directly from assembly language so we have included a special DUMB mode to output eight bit code. This is invoked by "CONTROL I" followed by "ZH". :

TEXT SCREEN PRINTOUT

Typing "CONTROL I" & then "S" while the card is turned on will dump the current text screen to the printer. It can sense the presence & use of a IIe 80 column card & act accordingly.

(see reverse)

PERIPHERALS
27)AutoIce Printer Card

Australian designed and made printer card and cable for the open-architecture Apples II+, IIe and IIGS. Over 35,000 units sold in Australia alone. Features full graphics capability to most printers. $110 inc, 99ex

28) AutoIce Ext80 Card

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29) JOYSTICK

If you need a joystick for your IBM, Apple II+, IIe, IIc or IIGS (Specify when ordering) then this joystick is the one you need. Features centre fire button, robust construction. 3 mths warranty. $46

30) SLIMLINE DRIVE
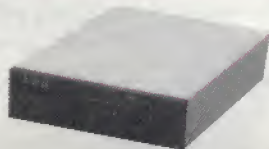
For Apple II+, IIe, IIc or IIGS (Specify when ordering). Our bread-and-butter disk drive. We sell literally thousands a year of this drive. IIe version $229 IIc, IIGS version $249

31) WESTINGHOUSE SPIKE FILTER
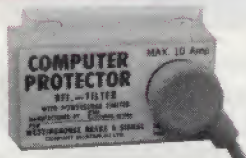
A more substantial line conditioner than the Button. Australian made. Smoothes the power as well as stopping spikes and surges. 3Amp version suits most single installations.
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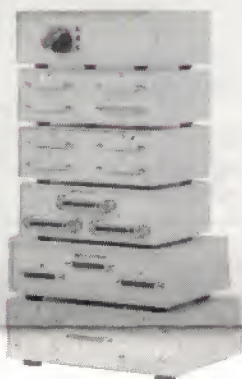Busmouse C7 also includes an extra half-card serial card. $249
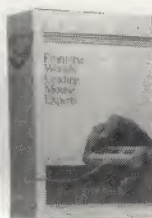
33) MOUSE MAT
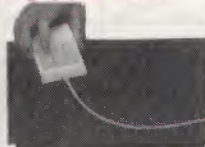
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PARALLEL SWITCH BOXES:
34)TSW-2P 1 device sharing with 2.
35)TSW-3P 1 device sharing with 3.
36)TSW-3PIBM 1 device with 3 (IBM)
37)TSW-4P1 device sharing with 4.
38)TSW-D2P 2 devices sharing with 2.
SERIAL SWITCH BOXES:
39)TSW-2S 1 device sharing with 2.
40)TSW-D2S 2 devices sharing with 2
PRICES: 34:$57. 35:$75
36:$95 37:$120 38:$120
39:$57 40:$120
These are below-wholesale bargain prices. Limited stock. **HURRY!!!**

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Presenting: the Micro-Ed Team:

George Parry: Managing Director. Started the company in January 1979 writing and selling (by his own admission - fairly ordinary) software, mostly by mail order in the US. Since that time he has seen the company grow from a one-man band to a multi-million dollar company. Current duties include advertising, making the coffee, overseas buying and coming to the office once a week looking like the gardener in boots and muddy moleskins.

John Peschar: Office Manager and software developer. John has worked at Micro-Ed for 4 years, serving his technical apprenticeship with Wormalds. John has broad expertise in all aspects of PC hardware and software and has a wonderful phone-side manner. An inveterate hacker, John has more computer systems than John Laws has cars. Writes commercial software in his spare time.
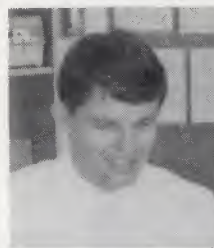
Bernard Catt: Product Manager. Bernard has been with the company for almost 5 years now and has developed considerable expertise in PC and Macintosh systems hardware, networking and software. Trained at MacDonalds, Bernard has developed patience and politeness into an art form. Beneath the quiet exterior is a warehouse of computer knowledge, a biting wit and a steady determination to achieve his goals. Another computer enthusiast.

Sue Stonham. Secretary. Sue has been with the company from its early days and has seen it grow from a backyard show to a medium-sized company. Not a computer enthusiast though she has a couple of computers at home purely for word-processing, Sue has a considerable knowledge of the products we sell. And not being an enthusiast she keeps our egos down to size where necessary.

Rob Lovett. Technical Manager. Another real computer enthusiast. Rob has been with us for a couple of years - his real job is QANTAS steward so he gets us the latest magazines and new products - but he manages to work a 20 to 30 hr week at Micro-Ed. Something of an entrepreneur, his latest effort is a typesetting company, BIZTEX, using a Mac at home with the latest LaserWriter.

Wayne Herring. Despatch Manager. Our newest full-time recruit, Wayne came to us on work-experience and we felt his talents were too good to let him go back to school. Highly knowledgeable in the Amiga and Viatel areas, Wayne is also developing broad knowledge of the PC and Macintosh environment.

Helen Margach. Office Assistant. Also known as "Rowdy". Helen spends 2 days a week keeping our mailing list up to date. Naturally a quiet person but holds her own on the phone.

PERIPHERALS

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20)

A pov
cause
your f
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